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A bioethanol process development unit: initial operating experiences and results with a corn fiber feedstock

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Abstract

Interest in bioethanol production from lignocellulosic feedstocks for use as an alternative fuel is increasing, but near-term commercialization will require a low cost feedstock. One such feedstock, corn fiber, was tested in the US Department of Energy (DOE)/National Renewable Energy Laboratory (NREL) bioethanol pilot plant for the purpose of testing integrated equipment operation and generating performance data. During initial runs in 1995, the plant was operated for two runs lasting 10 and 15 days each and utilized unit operations for feedstock handling, pretreatment by dilute sulfuric-acid hydrolysis, yeast inoculum production, and simultaneous saccharification and fermentation using a commercially available cellulase enzyme. Although significant operational problems were encountered, as would be expected with the startup of any new plant, operating experience was gained and preliminary data were generated on corn fiber pretreatment and subsequent fermentation of the pretreated material. Bacterial contamination was a significant problem during these fermentations.

Keywords: Corn fiber; Cellulose; Pilot plant; Pretreatment; Fermentation; Dilute-acid hydrolysis; Cellulase; Ethanol; Contamination